SECTION 1135

ECOSYSTEM RESTORATION REPORT

APPENDIX B

DRAFT ENVIRONMENTAL ASSESSMENT

FOR

JOHN'S ISLAND
PALM BEACH COUNTY, FLORIDA

U. S. ARMY CORPS OF ENGINEERS
JACKSONVILLE DISTRICT

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

JOHN'S ISLAND ENVIRONMENTAL RESTORATION
PALM BEACH COUNTY, FLORIDA
ENVIRONMENTAL ASSESSMENT

FINDING OF NO SIGNIFICANT IMPACT

I have reviewed the planning document and the Environmental Assessment of the considered action. This finding incorporates by reference all discussions and conclusions contained in the environmental assessment enclosed herein. Based on information analyzed in the Environmental Assessment, reflecting pertinent data obtained from cooperating Federal and State agencies having jurisdiction by law and/or special expertise, and from the interested public, I conclude that the considered action will have no significant adverse impact on the quality of the natural or human environment.
Reasons for this conclusion are, in summary:

1. The work will be conducted in accordance with the requirements of the National Marine Fisheries Service and the U. S. Fish and Wildlife Service for impacts to manatees, sea turtles and other Federally listed threatened and endangered species. The proposed action will not jeopardize the continued existence of any Federally listed threatened or endangered species or adversely impact any designated "critical habitat." No Essential Fish Habitat will be adversely affected by this project.

a. There will be no significant impact to threatened or endangered species or sites of cultural or historic significance,

b. A Water Quality Certification from the Florida Department of Environmental Protection may be required. State water quality standards will be met,

c. Measures to eliminate, reduce, or avoid potential adverse impacts to fish and wildlife resources will be implemented during project construction,

d. The proposed environmental restoration project will provide habitat for fisheries and wildlife,

e. Historic properties included in or eligible for inclusion in the National Register of Historic Places are not located in the proposed environmental restoration area.

In consideration of the information summarized, I find that the proposed action will not significantly affect the human environment and therefore does not require an Environmental Impact Statement.

22 JUN 01
Date

for CP Boruch LTC, EN Deputy

JAMES G. MAY
Colonel, U.S. Army
District Engineer

Christopher P. Boruch
Lieutenant Colonel, U.S. Army
Acting District Engineer

JUNE 2001

SECTION 1135

ENVIRONMENTAL RESTORATION
JOHN'S ISLAND
PALM BEACH COUNTY, FLORIDA

ENVIRONMENTAL ASSESSMENT

U.S. Army Corps of Engineers
Jacksonville District
South Atlantic Division

SECTION 1135
ENVIRONMENTAL RESTORATION REPORT
JOHN'S ISLAND
PALM BEACH COUNTY, FLORIDA
ENVIRONMENTAL ASSESSMENT

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SUMMARY

The U.S. Army Corps of Engineers, Jacksonville District, in partnership with the Department of Environmental Resource Management of Palm Beach County are proposing to perform environmental restoration of John's Island, Palm Beach County, Florida. Approximately 6.4 acres in size, John's Island was formed through the placement of dredged material deposits during the creation and maintenance of the Lake Worth Inlet and Intracoastal Waterway. The island is no longer used for disposal purposes and exotic vegetation consisting primarily of Australian pine, Brazilian pepper and seaside mahoe has become established over a large portion of the island's interior. Restoration would be accomplished by removing dredged material and exotic vegetation, and re-establishing native habitats. Project features would include: revitalization of approximately 1.7 acres of extant mangroves; planting of approximately 3.3 acres of red mangroves and 1.4 acres of tropical hammock; and removal of approximately 5 acres of exotic vegetation. An integral part of the proposed work would be the excavation of two tidal inlets and the connecting of flushing channels on the north and eastside of the island. Tentatively scheduled to begin in 2001, the environmental restoration of John's Island would enhance the Lake Worth Lagoon Ecosystem by providing habitat for native plants, fish, and wildlife.

ENVIRONMENTAL ASSESSMENT
JOHN'S ISLAND ENVIRONMENTAL RESTORATION
PALM BEACH COUNTY, FLORIDA

1.0 PROJECT PURPOSE AND NEED

1.1 PROJECT LOCATION

John's Island is located within the Lake Worth Lagoon, Palm Beach County, Florida (Figure 1). A strand of barrier islands on the east and the mainland on the west delimits the boundaries of the lagoon. John's Island also lies just east of the Intracoastal Waterway and opposite the C-51 canal.

1.2 PROJECT NEED OR OPPORTUNITY

The *Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study,* completed in 1990 by Dames and Moore for Palm Beach County, identified John's Island as a high priority site for environmental restoration. Tentatively scheduled to begin in 2001, the restoration of John's Island would enhance the Lake Worth Lagoon Ecosystem by providing habitat for native plants, fish, and wildlife.

1.3 AGENCY GOAL OR OBJECTIVE

The U.S. Army Corps of Engineers (Corps), Jacksonville District, in partnership with the Palm Beach County Department of Environmental Resources Management (PBC DERM) are proposing to remove dredged material and exotic vegetation from John's Island, and re-establish native habitats. An integral part of the proposed work would be the excavation of two tidal inlets and the connecting of flushing channels on the north and eastside of the island. Also, the island will no longer be used for disposal of dredged materials. The restoration effort should substantially increase levels of biological productivity and bio-diversity.

1.4 AUTHORITY

The Corps has the authority, provided under Section 1135 of the Water Resources Act of 1986, as amended, to perform the proposed restoration of John's Island. PBC-DERM would act as the local sponsor.

1.5 NEPA DOCUMENTATION

Pursuant to the National Environmental Protection Act (NEPA), this Environmental Assessment (EA) was prepared by the Corps in order to address the potential impacts that the proposed federal action would have on the environment. Additional NEPA documents regarding projects within the Lake Worth Lagoon are as follows:

(1) January 1995, EA, Section 1135, Environmental Restoration Report, Munyon Island, Palm Beach County;

(2) June 2000 EA, Section 1135, Environmental Restoration Report, Peanut Island, Palm Beach County;

(3) June 2000 EA, Change of Maintenance Operations at Palm Beach Harbor and Peanut Island, Palm Beach County;

(4) December 2000 EA, Section 206, Wetland Restoration Report, City of Lake Worth, Palm Beach County.

1.6 DECISIONS TO BE MADE

This Environmental Assessment will evaluate whether the proposed environmental restoration project will adversely affect any threatened or endangered species, degrade water quality or not be consistent with coastal zone consistency requirements.

1.7 SCOPING AND ISSUES

1.7.1 ISSUES TO BE EVALUATED IN DETAIL

The following issues were identified as relevant to the proposed action and appropriate for detailed evaluation:

(1) West Indian Manatee. The West Indian Manatee is a Federally Endangered Species known to inhabit the waters of the Lake Worth Lagoon. Although no proposed work for the environmental restoration project would potentially disrupt, harm or harass the manatee all standard manatee conditions and recommendations to avoid adverse effects to manatees will be implemented while the environmental restoration project construction is underway. The USFWS has indicated that manatee protection controls will be necessary within the project area (see Appendix C – Pertinent Correspondence, USFWS Coordination Act Report dated July 14, 2000).

(2) Seagrasses. The Corps' contractor (Dial Cordy and associates) performed a marine seagrass survey of the Intracoastal Waterway (IWW) within Palm Beach County from August 24 through September 3, 1999. Results of the survey indicated that the proposed barge route within the IWW up to and including the disposal site, the anoxic hole adjacent to the Lake Worth Golf Course, is devoid of seagrasses. However, a sparse community of *Halophila johnsonni and H. decipiens* was noted west of the hole within the littoral zone adjacent to the golf course. The proposed work area around John's Island is also devoid of seagrasses. This area was surveyed by the local sponsor in mid-May, 2001.

(3) Migratory Birds. Although John's Island is not recognized as a migratory bird loafing, roosting or nesting area at this time, the standard migratory bird protection measures described in the 01410 Plans and Specifications will be implemented during construction of the environmental restoration project. The USFWS has indicated that migratory birds should not be adversely impacted (see Appendix C – Pertinent Correspondence, USFWS Coordination Act Report dated July 14, 2000).

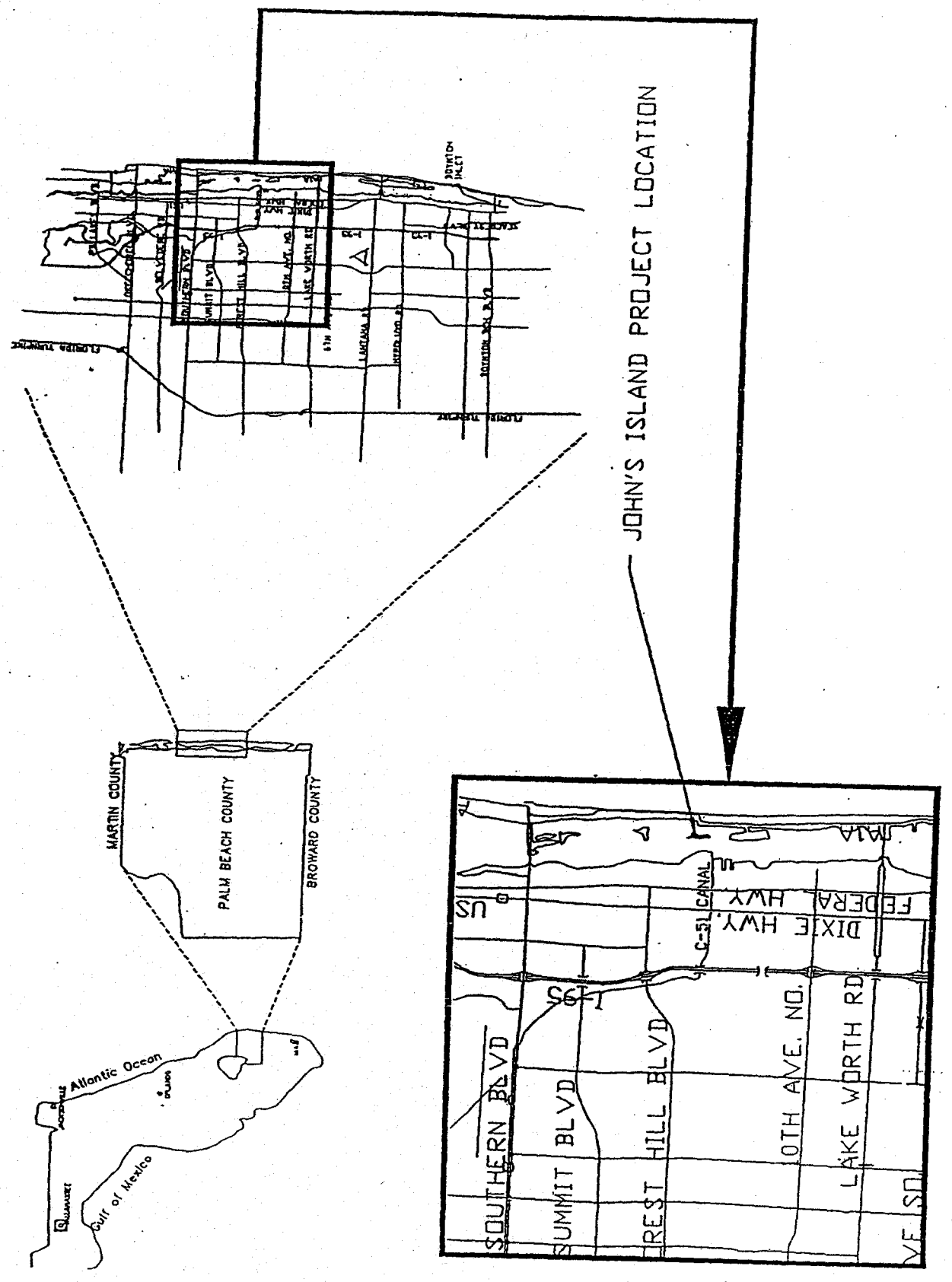
(4) Sea Turtles. Although John's Island is located within a region of known sea turtle activity it is not anticipated that endangered or threatened sea turtles will be found within the proposed project area. The island is adjacent to the IWW with the Lake Worth Inlet approximately 12 miles to the north and Boynton Inlet approximately 7 miles to the south. The salinity levels of the John's Island surrounding waters are low, 28.3 to 35.8 parts per thousand, due to the fresh water discharges from Canal 51. The USFWS has indicated that sea turtles should not be adversely affected (see Appendix C – Pertinent Correspondence, USFWS Coordination Act Report dated July 14, 2000).

1.8 PERMITS, LICENSES AND ENTITLEMENTS

The proposed environmental restoration project is subject to the Coastal Zone Management Act. In addition, consultation with the State Historic Preservation Officer is required. Placement of dredged material is proposed for a previously dredged area, an anoxic hole, adjacent to the City of Lake Worth Municipal Golf course. This proposed action may require a State of Florida General Permit for Environmental Restoration Projects and the completion of a Section 404(B) Clean Water Act Evaluation. Section 401 of the Clean Water Act for certification of water quality by the State of Florida may also be required. The local sponsor currently holds the requisite interests in lands essential for the project and is in the process of applying for a Environmental Resource Permit from the Florida Department of Environmental Protection.

Location Map (State – County – City - Project)

FIGURE 1



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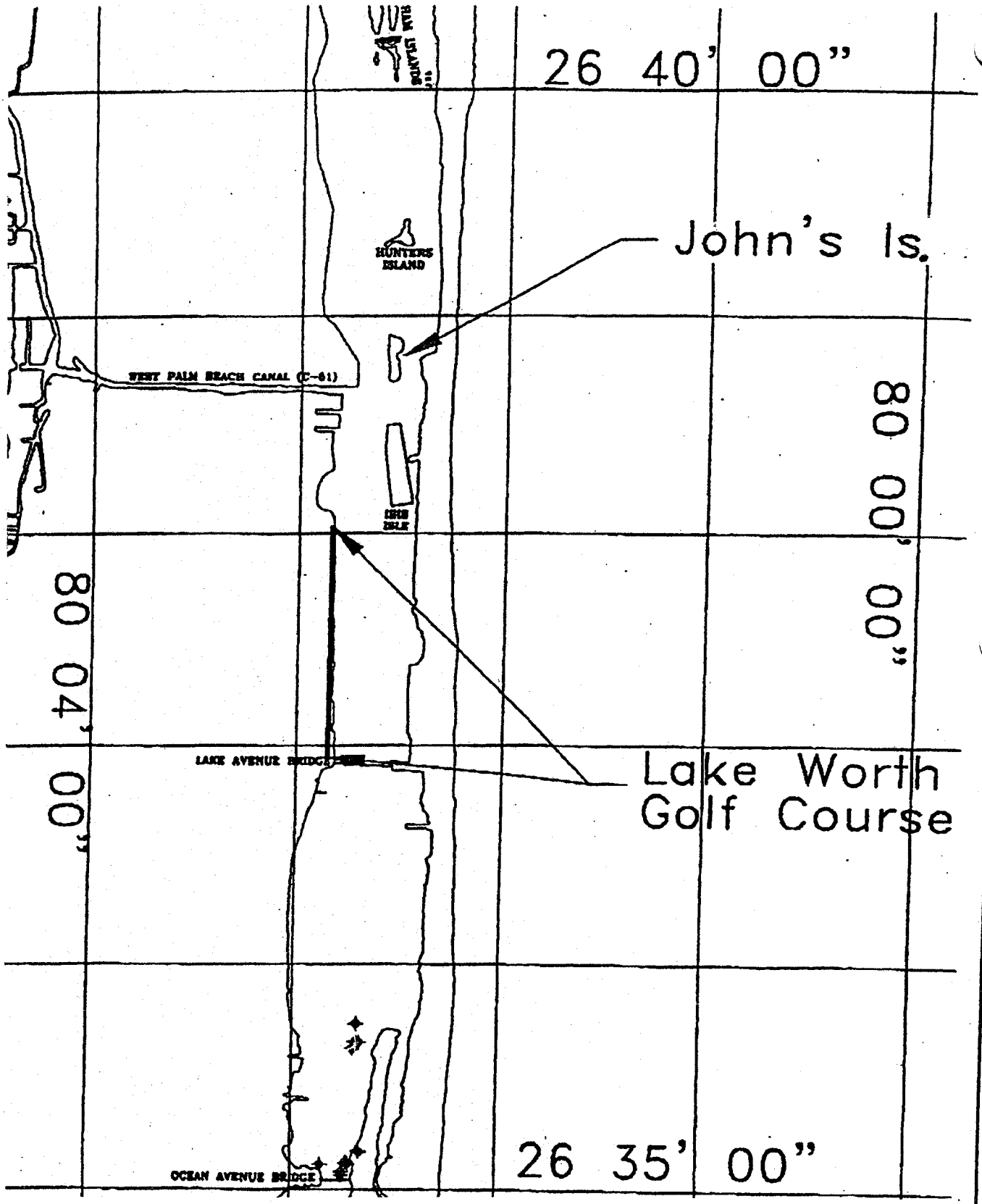
PALM BEACH COUNTY, FLORIDA

Location Map (Intracoastal Waterway Project – Disposal Area) FIGURE 2



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2.0 ALTERNATIVES

The alternatives section is the heart of this EA. This section describes in detail the proposed action, the no action alternative, and other reasonable alternatives that were studied in detail. Based on the information and analysis presented in the section on the Affected Environment and the Probable Impacts, this section presents the beneficial and adverse environmental effects of all alternatives in comparative form, providing a clear basis for choice among the options for the decision maker and the public.

2.1 DESCRIPTION OF THE PROPOSED ACTION

The proposed John's Island environmental restoration will be accomplished by removing exotic vegetation and dredged material deposits, and re-establishing native habitats. Project features would include: restoration of approximately 1.7 acres of existing mangroves, planting of approximately 3.3 acres of red mangroves, planting of approximately 1.4 acres of tropical hammock and removal of approximately 5 acres of exotic vegetation. The 1.7 acres of existing mangrove habitat will be restored by the creation of two tidal inlets, with shoreline protection, and connected flushing channels on the north and eastside of the island (see Figure 3, Alternative A and Table 1, Alternatives Considered and their Components).

2.2 DESCRIPTION OF ALTERNATIVES

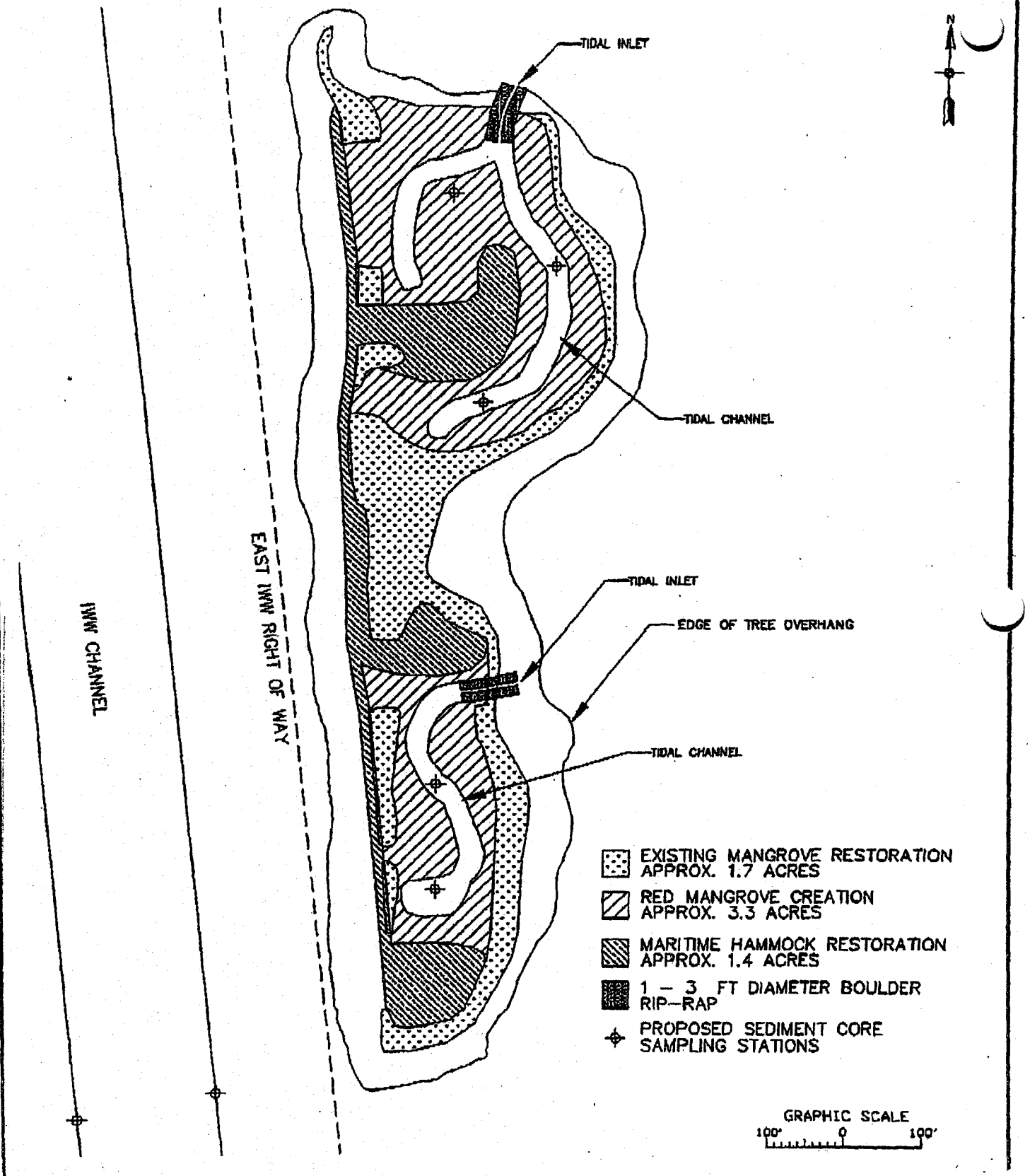
2.2.1. PROPOSED ACTION, ENVIRONMENTAL RESTORATION WITH ANOXIC HOLE DISPOSAL.
This proposed project alternative is as described in Section 2.1 above. Dredged material from John's Island would be placed in a previously dredged area, an anoxic hole, adjacent to the City of Lake Worth Municipal Golf Course shoreline. This option is probably the most cost effective and acceptable from an environmental standpoint (see Figure 6 & 7).

2.2.2. OTHER DISPOSAL SITES
Options could include beach disposal if material is acceptable, nearshore disposal, offshore disposal or upland disposal. These options are generally considered to be more costly, not available, or environmentally unacceptable.

2.2.3. NO ACTION ALTERNATIVE (STAUS QUO)
Not restoring the John's Island degraded habitat would continue to provide an exotic vegetation seed source for all shorelines within the Lake Worth Lagoon and an opportunity to provide native habitats more suitable for area fish and wildlife would be lost.

Proposed Project Conceptual Plan

FIGURE 3



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NOTES:

1) All elevations are in feet referenced to the National Geodetic Vertical Datum of 1929 (N.G.V.D.)
2) All slopes to grade = 3H:1V.
3) Mean High Water (MHW)+1.6 feet N.G.V.D.
4) Approximately 16,948 cubic yards of spoil to be excavated.

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Jacksonville, Florida

Figure 4

EXCAVATION LOCATIONS

Section 1135 Ecosystem Restoration Repo
Palm Beach County, Florida

NOTES:

1) All elevations are in feet referenced to the National Geodetic Vertical Datum of 1929 (N.G.V.D.)
2) All slopes to grade 3H:1V.
3) Mean High Water (MHW) = 1.6 feet N.G.V.D.
4) 13,800 red mangroves will be planted 3 feet on center.
5) 11,400 smooth cordgrass will be planted two feet on center along the wetland perimeter and along tidal channels.
6) 480 tropical hammock plants will be planted 7 feet on center.

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Figure 5

PLANTING LOCATIONS

Section 1135 Ecosystem Restoration Rep
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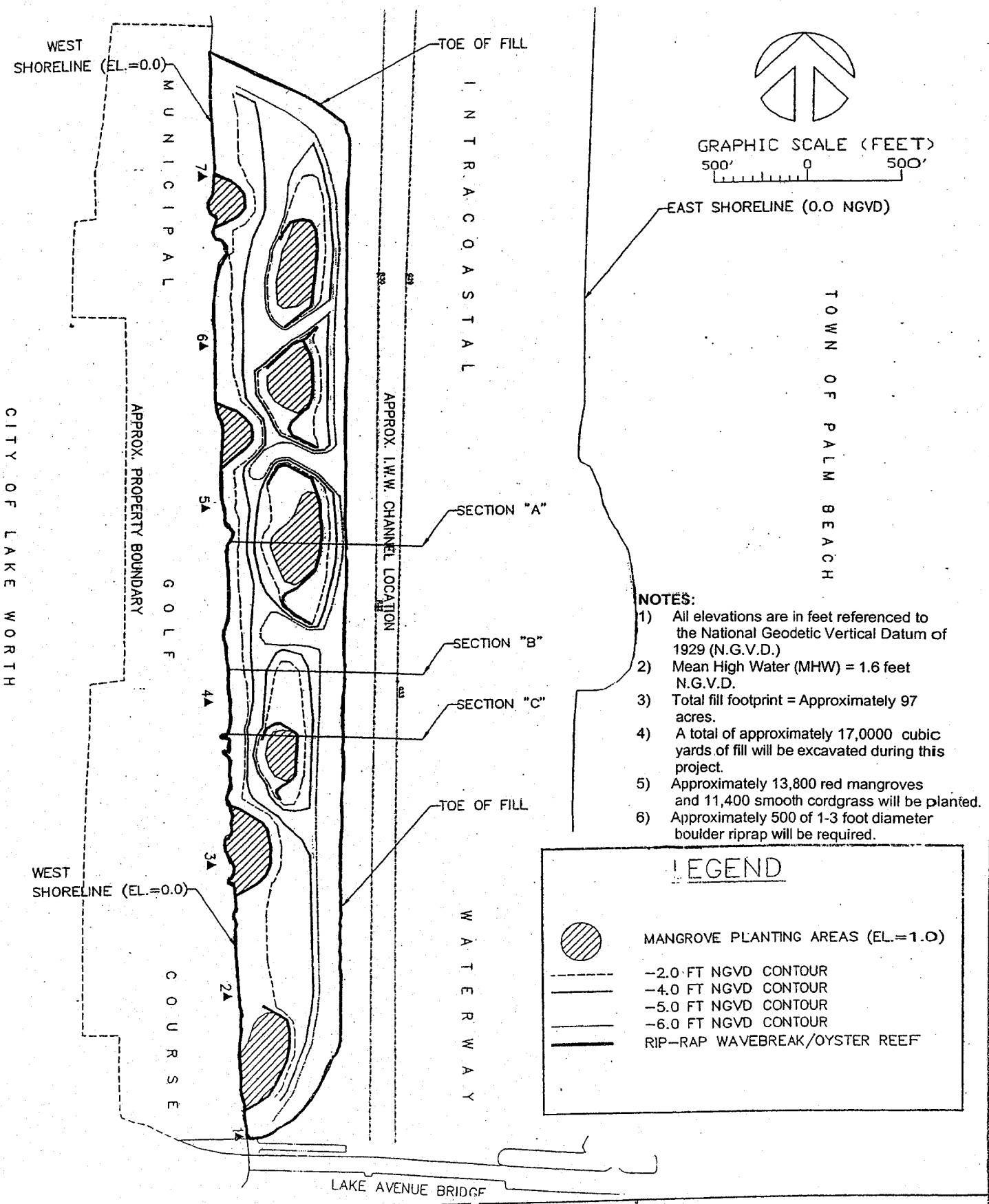
Preferred Disposal Alternative Site Plan

FIGURE 6



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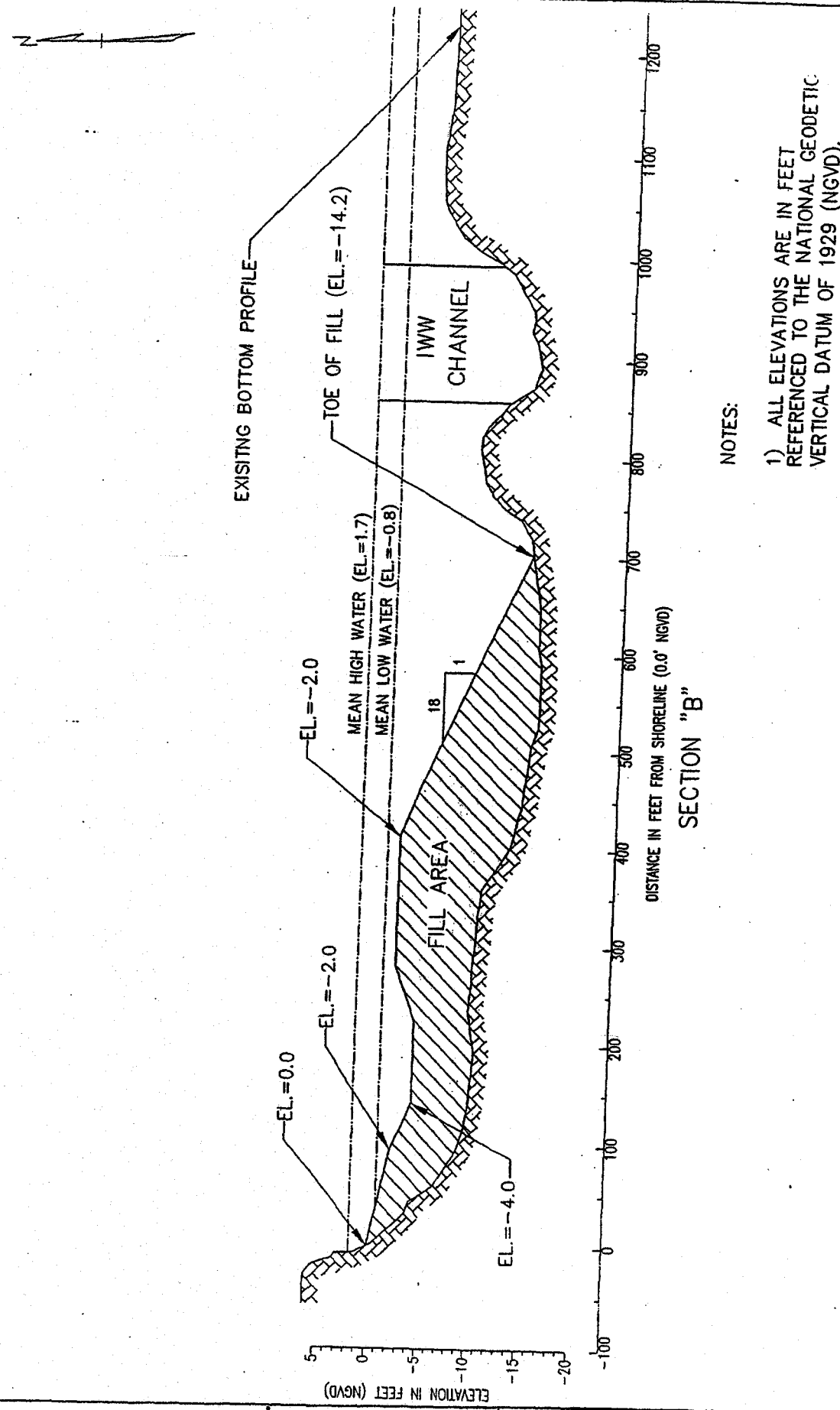
Preferred Disposal Alternative Cross-Section

FIGURE 7



NOTES:

1) ALL ELEVATIONS ARE IN FEET REFERENCED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD).

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TABLE 1: ALTERNATIVES CONSIDERED AND THEIR COMPONENTS

PROPOSED COMPONENTS	ALT. A	ALT. B	ALT. C STATUS QUO
Exotic Vegetation Removal w/Chipping	YES	YES	NO
Excavated Material Disposal –Anoxic Hole	YES	NO	NO
Excavated Material Disposal – Elsewhere	NO	YES	NO
Tropical Hammock Creation	YES	YES	NO
Wetland Habitat Creation (Mangrove & Spartina Plantings)	YES	YES	NO
Tidal Inlet & Channel Construction with Inlet Shoreline Rip Rap	YES	YES	NO
Mangrove Restoration	YES	YES	NO

ALT. A = Exotic Vegetation Removal & Chipping, Excavated Material Removal to Anoxic Hole, Mangrove Restoration, Wetland Planting, Tropical Hammock Planting, Tidal Inlet & Channel Construction, Inlet Bank Stabilization

ALT. B = Exotic Vegetation Removal & Chipping, Excavated Material Removal Elsewhere, Mangrove Restoration, Wetland Planting, Tropical Hammock Planting, Tidal Inlet & Channel Construction, Inlet Bank Stabilization

ALT. C = No Action

2.3 SUMMARY OF IMPACTS

The impacts of the various alternatives are summarized in Table 2, Summary of Direct and Indirect Impacts. A more detailed description of the impacts are available in part 4.0, "Environmental Affects". The proposed project component impacts are measured in acres.

TABLE 2: SUMMARY OF DIRECT AND INDIRECT IMPACTS

ALTERNATIVES **ENVIRONMENTAL FACTORS**	**Alternative A - Anoxic Hole Disposal**	**Alternative B – Disposal Elsewhere**	**Alternative C – No Action (Status Quo)**
PROTECTED SPECIES	Manatee & Seagrass Concerns (precautions to be implemented).	Manatee & Seagrass Concerns (precautions to be implemented).	No Impact
FISH AND WILDLIFE RESOURCES	No Adverse Effects Anticipated.	No Adverse Effects Anticipated.	No Impact
VEGETATION	No Impacts Anticipated.	No Impacts Anticipated.	No Impact
WATER QUALITY	Discharge would cause a turbidity plume (silt screen would be installed).	If an upland site is selected, no discharge into wetlands or waters.	No Impact
HISTORIC PROPERTIES	No Adverse Effects Anticipated.	No Adverse Effects Anticipated.	No Impact
RECREATION	Potential disruption during construction.	Potential disruption during construction.	No Impact
AESTHETICS	Potential disruption during construction.	Potential disruption during construction.	No Impact
ECONOMICS	No Impacts Anticipated	No Impacts Anticipated	No Impact
MIGRATORY BIRDS	No Impacts Anticipated	No Impacts Anticipated	No Impact
ENERGY REQUIREMENTS AND CONSERVATION	Could save energy if closest (Anoxic Hole) disposal option utilized (Anoxic Hole is 3,000 feet to the southwest).	Could save future energy costs with closer disposal option (higher disposal costs likely).	No Impact
HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES	No HTRW Likely (Based on Database Search & Site Visit).	No HTRW Anticipated	No Impact
NAVIGATION	No Impacts Anticipated	No Impacts Anticipated	No Impact
HARDGROUNDS	No Impacts Anticipated	No Impacts Anticipated (research required)	No Impact

3. AFFECTED ENVIRONMENT

The affected environment section succinctly describes the existing environmental resources of the project areas that could be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would be affected or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

3.1 GENERAL ENVIRONMENTAL SETTING

3.15 HISTORY

3.15.1 CREATION OF JOHN'S ISLAND

John's Island was apparently created in the early 1880s as determined by a survey circa 1884 (Figure 8). The island was formed from dredged materials excavated from the IWW. At that time it was a long and narrow island and amounted to approximately 3.4 acres. U.S. Army Corps of Engineer (Corps) records show that maintenance of the IWW between 1929 and 1993 (Table 1 – Alternatives Considered and Their Components) has resulted in further disposals of dredged material on John's Island. The island has not been used for dredged material disposal for some time as native and non-native plant species now cover the island. Mangrove trees on the island are estimated to be 30 years old or more.

3.15.2 OWNERSHIP

The island is owned by the Town of Palm Beach (Town) and has remained in its current state for many years. It is referenced as Government Lot 17 in the Interlocal Agreement, dated August 19, 1997 (see Appendix C – Pertinent Correspondence). The Interlocal Agreement is between the Town and the Palm Beach County Department of Environmental Resources Management (PBC DERM) to provide authorization for joint cooperation to restore City of Palm Beach owned islands in the IWW. This document provides PBC DERM the authority to perform restoration of native habitats on the island. The National Audubon Society participates in the design of environmental restoration studies for the City of Palm Beach owned islands.

3.16. LAKE WORTH LAGOON

Water quality and habitat resources of the Lake Worth Lagoon estuary have been drastically impacted by the surrounding urbanization over the past one hundred years. It is clear from review of historical accounts and catch records that commercial and recreational fisheries have greatly declined over the past forty years (Woodburn, 1961; Harris, et al., 1983; Lewis et al., 1985; McCrary et al., 1985; WPB Fishing Club, 1990). The most likely reasons for fisheries declines are habitat destruction and water quality degradation (Dames and Moore, 1990) as well as greater angling pressure. Lake Worth Lagoon's shoreline is approximately 70 linear miles, most of which has been altered by dredging, filling, and bulkhead construction (Dames and Moore, 1990).

3.16.1 SHORELINE ALTERATIONS

Bulkheads have been constructed on approximately 65% of the shoreline, including canals (Dames and Moore, 1990). The linear extent of shoreline types within Lake Worth Lagoon has changed dramatically within the vicinity of John's Island. The destruction of these areas, along with increasing pressures on the remaining resources, have degraded the remaining Lake Worth native habitats and has led to a decline in associated fish and wildlife in the Lake Worth Lagoon estuary.

3.16.2. DREDGED AREAS

Within the Lake Worth Lagoon, there are deep dredged areas that have low water quality due to the lack of circulation and thermo-stratification. With the construction boom in the 1950-60's, these areas were 'borrow sites' to generate fill for nearby properties. These deep holes typically act as sinks for organically enriched sediments and have very low dissolved oxygen levels near the bottom. These conditions generally result in very low diversity of benthic fauna or, in some cases the sediments are totally devoid of benthic invertebrate life. The material generated from the John's Island Environmental Restoration Project

is suitable for placement within the Lake Worth Lagoon adjacent anoxic hole on the shoreline of the City of Lake Worth Golf Course (see Figure 12) cross-section of lake worth golf course shoreline restoration) .

3.16.3 MANGROVES
3.16.3a DISTRIBUTION
An estimated 87% loss in mangrove wetlands has occurred between 1940 and 1975 in the Lake Worth Lagoon Estuary as a result of shoreline development (Harris et al., 1983). The ecological value of mangrove communities has been well documented. Currently only about 19% of Lake Worth Lagoon's shoreline (including islands) has fringing mangroves.

3.16.3b. IMPORTANCE
Mangroves are vital to the survival of many species of fish, invertebrates and wildlife providing the base of a complex food chain, as well as providing breeding habitat and establishment of restrictive areas that offer protection for juveniles. In addition, mangroves contribute to improved water quality by filtering and assimilating pollutants, stabilizing bottom sediments, and protecting shorelines from erosion. Mangrove communities provide habitat for marine organisms, protect shorelines from erosion, and enhance water quality by acting as natural filters. Detrital material produced by mangroves is the basis of the food chain for south Florida's marine and estuarine ecosystems.

3.16.4 JOHN'S ISLAND RESTORATION STATUS
John's Island is currently littered with exotic plant species, primarily Australian pine, Brazilian pepper and Seaside Mahoe, that shade out other desirable native plants. A large impounded mangrove habitat currently exists on the eastern side of the island. The island has largely been untouched since the last dredge disposal event occurred on the island probably some thirty or more years ago.

Palm Beach County's Department of Environmental Resources Management utilizes the *Lake Worth Lagoon Natural Resources Inventory and Resource Enhancement Study* as a guide providing analysis of resource trends, as well as recommendations and prioritization for habitat enhancement projects to be undertaken. John's Island has long been recognized as having great potential for restoration due to its productivity potential. The ebb and flow of the tides deliver nutrients as well as providing a corridor for marine life.

3.2 VEGETATION
Exotic plant species, primarily Australian pine, Brazilian pepper and Seaside Mahoe, have become established over a substantial portion of the island's interior and are out-competing desirable native plants. A large impounded mangrove habitat currently exists on the eastern side of the island. Disposal of dredged material has not occurred here since the 1970's.

3.2.1 SEAGRASS
3.2.1a. DISTRIBUTION
Seagrass communities can be found scattered throughout the Lake Worth Lagoon with perhaps the highest concentrations located near Munyon Island and in the vicinity of the inlet. In general, seagrasses are most abundant in the lagoon's littoral zones and in areas that contain good water quality. Dial-Cordy and Associates, working on behalf of the Corps, surveyed Palm Beach County for seagrasses and reported that they were not observed in the historic 'deadzone' of South Lake Worth (IWW-Reach 7). The lack of seagrasses in this area has been attributed to freshwater discharges from the C-51 canal (*Marine Seagrass Survey of the Atlantic Intracoastal Waterway, Palm Beach County*, 1999). The local sponsor has determined that the proposed work area adjacent to John's Island is devoid of seagrasses. Locations of currently known seagrass beds in the project area are depicted in Figure 11.

3.2.1b. IMPORTANCE
Seagrass beds are highly productive and ecologically important habitats within south Florida's estuaries and coastal lagoons. The combination of plentiful shelter and food makes seagrasses possibly the richest nursery and feeding grounds in south Florida's coastal waters. A variety of juvenile finfish and shellfish of commercial and recreational value utilize seagrass beds. They also maintain water quality by trapping fine sediments with their leaves and stabilizing the bottom with their roots and rhizomes.

3.2.1c RECRUITMENT

Seagrass recruitment in south Florida waterbodies is dependent on water salinity, light penetration, depth of benthic substrate, substrate composition, and other factors. Within the 20-acre wetland habitat created on Munyon Island, Palm Beach County staff recorded the natural recruitment of a number of seagrass species including *Halodule wrightii, Thalassia testudinum, Halophila Johnsonii,* and *Halophila decipiens.* The tidal channels and ponds on Munyon Island total approximately 5.0 acres. Of the total 1.6 acres created in 1992-93 (Phases I and II), approximately 80% have been colonized with seagrass, representing approximately 1.3 acres of new seagrass habitat. An additional 3.4 acres of tidal channels and ponds were created during Phase III, in late 1997 and to date, approximately 10% have been colonized with seagrass, representing approximately 0.34 acres of seagrass. The Phase III project area is still developing and it is anticipated that seagrass colonization will be similar to the percentages seen in Phases I and II (Palm Beach County DERM- work in progress). The Munyon Island Environmental Restoration Project and associated mangrove and seagrass habitats have provided a substantial contribution in terms of habitats and productivity to Lake Worth Lagoon's fisheries and wildlife. It is anticipated that similar results will occur at the John's Island Environmental Restoration Project. Nearly an acre of created tidal channels and inlets will provide an opportunity for seagrass recruitment for the John's Island, Section 1135, Environmental Restoration Project.

3.2.2 MANGROVES

An isolated mangrove strand currently exists on the eastern side of the John's Island which consists of all three species of mangroves; red, *Rhizophora mangle*; black, *Avicennia germinans*; and white, *Laguncularia racemosa*, as noted by Palm Beach County Department of Environmental Resources Management resource analysis. The ecotone is impounded by a sand berm that can be submerged only during very high seasonal tides. The mangrove habitat is not functioning to capacity due to the inability of the system to be flushed. Lack of flushing precludes the detritus, an important food source and the basis of primary production, from entering the tidal system. Impoundment also affects the nutrient removal and sediment trapping capabilities of the mangrove system. Restoring tidal cuts and flushing to this mangrove habitat will allow the existing mangroves to function as part of the estuarine system by supplying food, shelter, nursery habitat, nutrient removal and sediment stabilization. It should be noted that the John's Island mangrove habitat and the targeted fish species will be very similar to that created in the Munyon Island Environmental Restoration Project. Both projects will provide habitat for fish species common to mangrove habitats that tend to be euryhaline, capable of withstanding a range of salinities.

3.3 THREATENED AND ENDANGERED SPECIES

In accordance with Section 7 of the Endangered Species Act, the U.S. Fish and Wildlife Service was contacted for their input concerning threatened (T) and endangered (E) species that are known to occur in the project area. The West Indian Manatee (*Trichechus manatus*) (E) and Sea Turtles [loggerhead sea turtle (*Caretta caretta* – T) green sea turtle (*Chelonia mydas* - E), leatherback sea turtle (*Dermochelys coriacea* -E), hawksbill sea turtle (*Eretmochelys imbricata* - E)] may be found within the project area. The proposed barge route up to and including the anoxic hole as well as the work area adjacent to John's Island are devoid of seagrasses.

Federally protected species utilizing the wetland restoration project area that have been observed by State Biologists and County Environmental staff on the similar nearby Munyon Island include:

> Wood Stork, Peregrine Falcon, Manatee, Least Tern, Little Blue Heron, Great Blue Heron, Reddish Egret, Snowy Egret, Gopher Tortoise, Brown Pelican, White Ibis, Osprey.

Federally protected species utilizing nearby Munyon Island and its surrounding wetland habitat are listed in Table 3, along with their Federal designation.

3.4 FISH AND WILDLIFE RESOURCES

The U. S. Fish and Wildlife Service reported in their July 14, 2000 Coordination Act Report the presence of several Federally listed threatened and endangered species that are known to occur in the project vicinity (see Appendix C – Pertinent Correspondence).

3.4.1 JOHN'S ISLAND FISH SURVEY

In August, 1996, staff from the Florida Department of Environmental Protection, Division of Aquatic Preserves completed a fish survey in the waters surrounding John's Island. The resulting list of fishes is reported in Table 4.

3.4.2 BIRD SPECIES

Table 5 provides a list of birds observed in nearby John D. MacArthur Beach State Park. More than 50 percent of the commonly observed bird species are linked to the aquatic environs of the park. The wetland habitats created and restored on John's Island, by the proposed environmental restoration project, will provide suitable habitat for most all species listed in Table 5. Creation of a tropical hammock and associated transitional zone will provide adjacent upland habitat for bird and wildlife species, while providing an important zone between wetland and upland habitats.

3.5 COASTAL BARRIER RESOURCES

The proposed John's Island environmental restoration project is not within a Coastal Barrier Resources (CBR) Unit or adjacent to any designated Coastal Barrier resource (see excerpts from the U. S. Fish and Wildlife Service Coordination Act Report of July 14, 2000 in Appendix C – Pertinent Correspondence). The closest CBR Unit is FL-18P, which is just north of the Lake Worth Inlet.

3.6 WATER QUALITY

Water quality data has been collected in Lake Worth Lagoon since the late 1960's. Data indicates that the lagoon is a moderately polluted estuarine system. A trend analysis indicates water quality either remained fairly constant or slightly improved over a fifteen-year period. Analysis of sediments for heavy metals and organic compounds indicate a system that chronically receives runoff from urban development (Dames and Moore, 1990).

3.6.1 HYDRAULIC INFORMATION

The hydraulic characteristics of Lake Worth Lagoon have been greatly altered from historic conditions by changes in tidal influence and fresh-water inflows. Peanut Island is located in the north-central Lake Worth Lagoon Estuary in designated Class III-Outstanding Florida Waters. It is bordered to the east by the Lake Worth Inlet and to the west by the IWW and the Port of Palm Beach.

3.6.2 TIDES

The tides in the project area are semidiurnal, having two high and two low water levels per day with little inequality. The tides have been monitored by the FDEP, Bureau of Survey and Mapping, and are as follows:

Mean High Water	+1.51 feet NGVD
Mean Low Water	-1.09 feet NGVD
Mean Tidal Range	2.60 feet NGVD

The tide gauge for the project area is gauge Number 8722588, located at the Port of Palm Beach, Riviera Beach, Florida.

3.6.3 FRESHWATER INPUT

Freshwater inflows to Lake Worth Lagoon according to South Florida Water Management District, 1977 are:

West Palm Beach Canal (C-51)	9.7%
Earman River (C-17)	2.1 %
Boynton Canal (C-16)	0.7%
Surface Runoff	0.1 %
Groundwater	2.3%

3.6.4 FRESHWATER RESIDENCE TIME

The C-51 canal is the largest inflow discharging an average of 356 million gallons per day. An estimated 75% of the discharge flows north and reaches the Lake Worth Inlet within five days. The remaining 25%

flows south and reaches South Lake Worth Inlet within nine days (SFWMD, 1977). The maximum residence time of the water body between the two inlets is approximately 14 days (Chiu et.al.,1970).

3.6.5 BATHYMETRY

Water depths within Lake Worth Lagoon are variable (<-1.0' to -30.0' NGVD). Numerous areas have been dredged for navigation. The IWW is maintained at -10' NGVD, the Lake Worth Inlet Channel and Port of Palm Beach are maintained at -35' NGVD.

ENDANGERED SPECIES, THREATENED SPECIES, RARE SPECIES AND SPECIES OF SPECIAL CONCERN THAT MIGHT BE FOUND IN AND AROUND LAKE WORTH LAGOON, PALM BEACH COUNTY, FLORIDA

LATIN NAME	COMMON NAME	STATUS
PLANTS		
Acrostichum aureum	Golden Leather Fern	E
Acrostichum danaeifolium	Giant Leather Fern	T
Cereus pentagonus	Dildo Cactus	T
Chrysophyllum oliviforme	Satin Leaf	E
Encyclia tampensis	Butterfly Orchid	T
Ophioglossum palmatum	Hand Fern	E
Opuntia humifusa	Twistspine Prickly Pear	T
Opuntia stricta	Prickly Pear	T
Phlebodium aureum	Golden polypody	T
Psilotum nudum	Whisk Fern	T
Tillandsia pauci folia	Wild Pine	T
Tillandsia valenzuelana	Soft Leaf Wild Pine	T
Vittaria lineata	Shoestring Fern	T
VERTEBRATES		
MAMMALS		
Trichecus manatus latirostris	West Indian Manatee	E
REPTILES		
Caretta caretta caretta	Loggerhead Turtle	T
Chelonia mydas mydas	Green Turtle	E
Gopherus polyphemus	Gopher Tortoise	SSC
Drymarchon corais couperi	Indigo Snake	SSC
BIRDS		
Ajaia ajaja	Roseate Spoonbill	SSC
Aramus guarana	Limpkin	SSC
Casmerodius albus	Great Egret	SSC
Charadrius melodus	Piping Plover	T
Egretta rufescens	Reddish Egret	SSC
Egretta thula	Snowy Egret	SSC
Egretta tricolor	Tricolored (Louisiana) Heron	SSC
Egretta caerulea	Little Blue Heron	SSC
Eudocimus albus	White Ibis	SSC
Falco peregrinus tundrius	Artic Peregrine Falcon	E
Haematopus palliatus	American Oystercatcher	SSC
Nyctanassa violacea	Yellowcrowned Nigh Heron	SSC